California Air Resources Board Emission Inventory Branch Summary of Agricultural Emissions Research in California

Project ID 1 Project Typ NAEMS: Da Emissions		Status	Completed	Estimated Completion Date	June 2009
Project Name National Air Emissions M Dairies, Part I (NAEMS C		dy (NAEMS)	: Air Emissions fr	rom California	
Project Description Accurately assess emissi estimation of emission ra methods/procedures from emissions at a commerci FTIR) analyzer	tes, promote n livestock op	a national coerations.Inc	onsensus for emi ludes monitoring	ssions-estimati of VOCs and G	on
PI 1	Affiliation PI		Fund Source 1		Amount 1
F. Mitloehner	UC Davis		Ag Air Research (AARC)	Council	\$250,000
PI 2	Affiliation PI	2 F	Fund Source 2		Amount 2
PI 3	Affiliation PI	3 F	Fund Source 3		Amount 3
Report Location http://www.epa.gov/airqu	ıality/agmonit	oring/techdo	ocs.html		
Related info 1					
Related info 2					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type		Status	Completed	Estimated	May 2009	
2	Dairy Emiss	sions			Completion		
					Date		
						J	
Project Name	e						
			tudy (NAEM	S): Air Emissions	from California		
Dairies, Part	II (NAEMS C	CA5B)					
Designat Dage	wim ti m m						
Project Desc		ana fram li	rootook opor	rations and comp	ilo a databasa fa	_	
				consensus for er			
				ncludes monitorin			
				Fourier transfor			
FTIR) analyz		,	O -1 F 24.		(-)		
,							
PI 1		Affiliation F	PI 1	Fund Source 1		Amount 1	1
F. Mitloehnei	r	UC Davis		ARB		\$40,0	00
PI 2		Affiliation F	01.2	Fund Source 2		Amount 2	2
Y. Zhao		UC Davis	1 4	r und Source 2		Amount 2	-
1. 21100		OO Davis					
PI 3		Affiliation F	913	Fund Source 3		Amount 3	3
Report Loca	ition						
http://www.e	pa.gov/airqu	ality/agmor	nitoring/tech	docs.html			
						_	
Related info	1						
Related info	2						
resided iiiie	<i>, </i>						
Please p	rovide projec	ct updates a	and correction	ons to:			

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ NAEMS: Da		Status	Completed		Estimated Completion	May 2	2009		
3	Emissions	airy				Date				
Duning Manage										
Project Name National Air Emissions Monitoring Study (NAEMS): Air Emissions from California										
Dairies from California Dairies, Part III (NAEMS CA5B)										
	Project Description									
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations.Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer										
PI 1		Affiliation F	PI 1	Fund Source 1			Am	ount 1		
F. Mitloehner		UC Davis		CDFA				\$70,000		
PI 2		Affiliation F	12	Fund Source 2			Am	ount 2		
Y. Zhao		UC Davis								
PI 3		Affiliation F	PI 3	Fund Source 3			Am	ount 3		
Report Location http://www.epa.gov/airquality/agmonitoring/techdocs.html										
Related info	0.1									
Related info	2									

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 4 NAEMS: Emission	Dairy	Completed Estimated Completion Date	June 2012
Project Name			
	Monitoring Study (NA	EMS): Air Emissions from California	
Dairies, Part IV (NAEM	S CA5B)		
roject Description			
stimation of emission	rates, promote a nation	operations and compile a database fonal consensus for emissions-estimans.Includes monitoring of VOCs and	ation
missions at a commer TIR) analyzer	rcial dairy using open-	path Fourier transform infrared (OP-	
N. 4	Affiliation PI 1	Fund Source 1	Amount 1
7. Mitloehner	UC Davis	UC Davis, College of Ag and Env'al Sciences	\$40,000
71 2	Affiliation PI 2	Fund Source 2	Amount 2
. Zhao	UC Davis		
13	Affiliation PI 3	Fund Source 3	Amount 3
Report Location			
nttp://www.epa.gov/air	quality/agmonitoring/t	echdocs.html	
Related info 1			

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 5	Dairy Emissions	Status	Completed	Completion	May 2010
				Date	
Project Name	2				
Project Name ARB Contract	et 05-344, Process-E	Based Farm Emi	ssion Model to Es	timate Air	
	om California Dairies		odion model to Le	All Tato 7 til	
D' 1 D	ata di a a				
Project Desc Ising biologi	cal principles and er	naineerina studio	as develon a fee	I/wasta straam	
	ed dairy farm emissi			waste stream	
임 1	Affiliation	on PI 1	Fund Source 1		Amount 1
R. Zhang	UC Day		ARB		\$299,191
Znang					
기 2	Affiliation	on PI 2	Fund Source 2		Amount 2
. Mitloehner			UC Davis		
기 3	Affiliation		Fund Source 3		Amount 3
A. Goldstein	UC Ber	keley	UC Berkeley		
Report Loca	tion				
http://www.a	ırb.ca.gov/research/	apr/past/05-344.	.pdf		
<u> </u>					
Related info	1				
Related info	2				
	.,				
	rovide project updat encer, Air Quality Pl				
	@arb.ca.gov	anning and Scie	NICE DIVISION		
916.324.					

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID Project Type	Status	Completed	Estimated	January 2007
6 Dairy Emissions			Completion	
			Date	

Project Name

Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California

Project Description

Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project ID 55.

PI 1	Affiliation PI 1	Fund Source 1 CSU Agricultural Research Initiative	Amount 1
C. Krauter	CSU Fresno		\$208,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	\$104,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	SJVAPCD	\$104,000

Report Location

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf

Related info 1

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

Related info 2

http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project Type Dairy Emissions	Status	Completed		Estimated Completion	December 2008
,			l	Date	

Project Name

Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers

Project Description

Develop real-time methods for evaluating process and time specific emission profiles for NH3, CH4, and H2S at dairies. A program to monitor ammonia emissions using the USEPA Emission Isolation Flux Chamber began in 2006 and continued through 2008. [No updates since 2006.]

PI 1	Affiliation PI 1	Fund Source 1 CSU Agricultural Research Initiative	Amount 1
D. Goorahoo	CSU Fresno		\$98,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	ARB	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Boreal Laser	

Report Location

http://www.deq.state.or.us/ag/dairy/docs/appendix/appendix_F.pdf

Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

Related info 2

Abstract on page 9 at this site:

http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	May 2009
8	Dairy Emissions			Completion	ו י
	Mitigation			Date	

Project Name

ARB Contract 04-343, Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley

Project Description

Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.

PI 1 C. Krauter	Affiliation PI 1 CSU Fresno	Fund Source 1 ARB	Amount 1 \$250,000
PI 2 D. Goorahoo	Affiliation PI 2 CSU Fresno	Fund Source 2 possible matching funds - CSUS Fresno Agricultural	Amount 2 \$250,000
PI 3 B. Goodrich	Affiliation PI 3 CSU Fresno	Fund Source 3	Amount 3

Report Location

http://www.arb.ca.gov/research/apr/past/04-343.pdf

Related info 1

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

Related info 2

Continuation of previous work

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	December 2006
9	Dairy Emissions			Completion	
	Mitigation			Date	

Project Name

Air Emission Mitigation Techniques and Technologies for California Dairies

Project Description

Evaluate dairy PM10, 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 Merced County via SWRCB and UC matching	Amount 1 \$600,000
PI 2 R. Zhang	Affiliation PI 2 UC Davis	Fund Source 2	Amount 2
PI 3 P. Robinson	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

Report Location

http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

Related info 1

Project objective described in PowerPoint at:

ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf

Related info 2

SJVAPCD Aug. 2005 VOC Emission Factors for Dairies, http://www.4cleanair.org/Documents/APCODetermination.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	June 2005
10	Dairy Emissions			Completion	
				Date	

Project Name

Volatile Organic Compound (VOC) Emissions from Cows Fed Typical California Rations

Project Description

Measurements of alcohols, volatile fatty acids, phenols, and methane (CH4) emitted from nonlactating (dry) and lactating dairy cows and their manure under controlled conditions. The experiment was conducted in an environmental chamber that simulates commercial concrete-floored freestall cow housing conditions. The fluxes of methanol, ethanol, and CH4 were measured from cows and/or their fresh manure.

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 US EPA	Amount 1 \$75,000
PI 2 B. Flocchini	Affiliation PI 2 UC Davis	Fund Source 2	Amount 2
PI 3 P. Robinson	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

Not Available

Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

Related info 2

UCD Dairy Air Quality Symposium presentation 10-11-06 available at: http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Typ		Status	Completed	Estimated	June 2007	
11	Dairy Emis	sions			Completion		
	Mitigation				Date		
Project Name							
		anure Aerat	ion on Air Qu	uality and Nutrien	t Cycling		
·	•			·	, 0		
Project Descr	rintion						
		the air and	water emiss	ion mitigation effe	ects of a wastew	ater	
reatment tecl	hnology for	California d	lairies to dete	ermine whether/to	what extent ae	robic	
•		ost-effective	ely reduce en	vironmental impa	acts associated v	with	
manure stora	ge.						
기 1		Affiliation F		Fund Source 1		Amount 1	
C. Collar		UCCE - Ki	ngs	UC ANR		\$30,000	
		County					
기 2		Affiliation F	1 2	Fund Source 2		Amount 2	
F. Mitloehner		UC Davis					
PI 3		Affiliation F		Fund Source 3		Amount 3	
J. McGarvey		USDA - AF	≀S	UCCE			
Report Locat	ion						
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Community F				ianagement. Tre	atinent, manding	y, and	
http://www.nr	raes.org/nra			etail≺_id=48&_l	JserReference=	8429860989D7	
67704899E0	1F						
Related info	1						
Related info	2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project ID	Project Type	Status	Completed	Estimated	2006
Project Name Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality Project Description Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste. Pi	12				Completion	
Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality Project Description Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste. P1		Management			Date	
Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality Project Description Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste. P1			_			1
Project Description Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste. Affiliation PI 1						
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Affiliation PI 2 UC Davis PL3 Affiliation PI 3 Affiliation PI 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	and Air Quali	ty				
Affiliation PI 2 UC Davis PL3 Affiliation PI 3 Affiliation PI 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	Project Dosc	rintion				
Affiliation PI 1 UC Davis PI 2 R. Zhang Affiliation PI 3 Fund Source 1 USDA - ARS \$30,300 Fund Source 2 Amount 2 Fund Source 2 Amount 2 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:			l anaerohic tres	itments have or	the microbiolog	ical
Affiliation PI 1 UC Davis PL2 R. Zhang Affiliation PI 2 UC Davis Fund Source 1 USDA - ARS \$30,300 PL2 R. Zhang Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Amount 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:			anacrobic acc	unionio navo oi	i tile illiorobiolog	ioai
Affiliation PI 2 UC Davis Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	and onemica	properties of waste.				
Affiliation PI 2 UC Davis Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Affiliation PI 2 UC Davis Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Affiliation PI 2 UC Davis Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Affiliation PI 2 UC Davis Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
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Affiliation PI 2 UC Davis Fund Source 2 Amount 2 Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	F. Mittoenner	OC Davis		JODA - ANO		φ30,300
Affiliation PI 3 Fund Source 3 Amount 3 Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	기 2	Affiliation	PI 2	und Source 2		Amount 2
Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	R. Zhang	UC Davis				
Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:						
Report Location Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	DI 2	A ffiliation	DI 2	und Course 2		Amount 2
Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	P1 3	Amilation	PI 3	una Source S		Amount 3
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Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211 Related info 1 Related info 2 Please provide project updates and corrections to:	Report Loca	tion				
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Please provide project updates and corrections to:						
Please provide project updates and corrections to:						
Janet Spencer, Air Quality Planning and Science Division	Please n	rovide project undates	and correction	s to:		
	Janet Sn	encer Air Quality Plan	ning and Scien	ce Division		

jspencer@arb.ca.gov

916.324.2717

California Air Resources Board **Emission Inventory Branch**

	Sum	mary of Aç	gricultural l	Emissions Re	search in Ca	lifornia
Project ID 13	Project To		Status	Completed	Estimated Completion Date	September 2009
Project Name						
∃stimating ar	nd Reducii	ng Air Emissi	ons from Dai	ry Feeding Opera	ations	
Project Desc	ription					
, , , , , , , , , , , , , , , , , , , ,		OC sources i	,			
PI 1		Affiliation F	11	Fund Source 1	0	Amount 1
F. Mitloehner	•	UC Davis		USDA - CSREE	ა 	\$278,000
기 2		Affiliation F	712	Fund Source 2		Amount 2
R. Zhang		UC Davis		USDA - ARS		
의 3		Affiliation F	713	Fund Source 3		Amount 3
C. Krauter		CSU Fresr	10	CSU Fresno		
Report Loca	tion					
Several stud	ly presenta	ations see be	low: no final	report located		

Related info 1

http://www.ag.iastate.edu/wastemgmt/Mitigation_Conference_proceedings/CD_procee dings/Animal_Housing-Treatment/Calvo-Freestall_housing.pdf

Related info 2

http://www.airquality.nrcs.usda.gov/AAQTF/Documents/200809_201008/200905_Fres noCA/01_Zhang_AAQTF_200905.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	e	Status	Completed	Estimated	June 2008
14	Dairy Nutrie	ent			Completion	
					Date	
Project Name						
Nutrient Bala	ances in Calif	ornia Dairy	Herds			
Project Desc	ription					
					California's Cen	tral
				als in drinking wa		
	d to characte	rize the mir	neral compos	sition of manure	from lactating da	iry
cows.						
임 1		Affiliation P	1 1	Fund Source 1		Amount 1
A. Costillo		UCCE Mer	ced	UC ANR		\$40,000
기 2		Affiliation P	1 2	Fund Source 2		Amount 2
F. Mitloehner		UC Davis	12	Tana Cource 2		Amount 2
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PI 3 D. Bacon		Affiliation P		Fund Source 3		Amount 3
J. Bacon		OCCE Tula	ai e			
Report Loca	ition					
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Related info	o 1					
Related info	n 2					
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	rovide projec					
•	encer, Air Qu	•	iing and Scie	nce Division		

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	March 2008
15	Dairy Emissions			Completion	
				Date	

Project Name

Effects of Dietary Rumensin® on GHG and VOC Emissions from Lactating Dairy Cows

Project Description

Feed additives, like monensin sodium (monensin), have been thought to improve cattle health and productivity, and have been used for these reasons for decades. industry is the impact the dairy industry has on the environment. A main environmental concern associated with the dairy industry is the emission of volatile organic compounds (VOC) and greenhouse gases (GHG).

PI 1 F. Mitloehner	Affiliation PI 1 UC Davis	Fund Source 1 Eli Lilly-Elanco	Amount 1 \$50,000
PI 2 E. DePeters	Affiliation PI 2 USDA-ARS	Fund Source 2	Amount 2
PI 3 J. MacGarvey	Affiliation PI 3 USDA - ARS	Fund Source 3	Amount 3

Report Location

http://www.extension.org/pages/Environmental_Responses_to_Dietary_Monensin_in_Lactating_ Dairy_Cows

Related info 1

Hamilton, S.W., E.J. DePeters, J.A. McGarvey, J. Lathrop, and F.M. Mitloehner. 2010. Greenhouse Gas, Animal Performance, and Bacterial Population Structure Responses to Dietary Monensin Fed to Dairy Cows. J. Environm. Qual. 39:1-9

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Š				
Project ID	Project Type	Status	Completed	Estimated	May 2010
16	Dairy Emissions			Completion	
				Date	
Dunin of Mann					
Project Name	ion Dairy Odor and Air	· Quality Educa	tion		
vesterri Keg	ion Daily Odol and All	Quality Educa	uon		
Project Desc				una tha	
	nis Professional Develo al impacts of dairy farm				
	e sustainability of the n				i l
	agricultural professiona				
	rn region, on the best r				
mitigate th	e degradation of air qu	ality. Four hand	ds-on workshops	will be conduct	ted,
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<u> </u>	Affiliation WSU		Sund Source 1 JSDA - SARE		Amount 1 \$89,000
. Ndegwa	WSO		JODA - JAKE		\$69,000
N 0	A ff:I: a ti a ia	DI O	and Course 2		A == =
<mark>1 2</mark> . Mittloehne	Affiliation UC Davis	PI Z	und Source 2		Amount 2
. WILLIOGITIE	OC Davis				
PI 3	Affiliation	DI 2	und Source 3		Amount 2
R. Sheffield	Univ. of Id		und Source S		Amount 3
t. Onomora	OTHV. OF IC	ano			
Donort Logo	tion			1	
Report Loca	lion				
No report, th	is was an educational	effort			
D 1 (1: (
Related info	rchers from NM State	(P. Hagayaart)	and OSII (M. C	amroth)	
Other resea	TCHEIS HOIH NIVI State	(K. nagevoort)	and OSO (IVI. G	amioui)	
Polotod info	2				
Related info					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Type Cattle Emissions	Status	Completed	Estimated Completion	2010
L				Date	

Project Name

Volatile Organic Compound and Greenhouse Gas Emissions from Growing and Finishing Feedlot Steers and Their Waste

Project Description

To quantify volatile organic compounds (alcohols, volatile fatty acids, amines, and phenols) and greenhouse gas (methane, nitrous oxide, and carbon dioxide) emissions from receiving, growing and finishing feedlot steers (enteric fermentation) and fresh waste using environmental chambers at UC Davis.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	California Cattlemen Assoc.	\$169,590
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA - ARS	California Feeder Council	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
		ARB/CCOS	\$10,000
			. ,

Report Location

J Environ Qual. 2011 May-Jun;40(3):899-906. doi: 10.2134/jeq2010.0354

Related info 1

Costs to be split between the two funding sources

Related info 2

ftp://ftp.arb.ca.gov/carbis/ptsd/polcomm/011008/concon.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type Equipment		Status	Completed	Estimated Completion	Dece	mber 2006
		,			Date		
Project Name	e						
		Funds Prog	ram				
Project Desc							
No description the http://animals			ulty/Mitloehr	er/pdf/Grants.pdf			
PI 1		Affiliation Pl	l 1	Fund Source 1			nount 1
F. Mitloehnei	r	UC Davis		UC Davis, Chance Research	ellor for	4	\$140,000
PI 2		Affiliation P	12	Fund Source 2		Am	nount 2
PI 3		Affiliation P	13	Fund Source 3		Am	nount 3
Report Loca	tion						
Not Applicat	ole						
Related info	0 1						
Related info	2						
Di	and decide	-11 -1					
Please p	roviae proje encer. Air C	ct updates a Quality Planni	nd corrections and Sciential	ons to: ence Division			
jspencer	@arb.ca.go						
916.324.	2717						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

20	Project Type	Status	Completed	Estimated	Februrary 2009
	Dairy Emissions			Completion	
				Date	
Project Name					
Covered Lago	oon Digester Emissi	on Measuremer	nts		
Project Descr	ription				
	ts of NH3, methane,	and VOCs at d	airies with CEC f	unded dairy dige	ster
	Evaluates the Dairy				
	courage the develop				nd
gasification ("	iogas") electricity ge	eneration projec	ts on California o	dairies.	
7. 4	∧ ff:liotio	n DI 4	Fund Course 1		Amaunt 1
PI 1	Affiliatio WURD	N PI I	Fund Source 1		Amount 1
P. Sousa	WURD				\$500,000
PI 2	Affiliatio		Fund Source 2		Amount 2
M. Summers	Summe	rs Consulting			
21.0	A ffiliatio	n PI 3	Fund Source 3		Amount 3
7I 3	Allillatio				
기 3	Amilatio				
213	Ailliatio				
Report Locat	tion	ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
Report Locat		ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
Report Locat	tion	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Locat	tion	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Locat	tion	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Locat	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
Report Locat	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
Report Locat	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Locat	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Locat http://www.ei	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	EC-500-2009-00	09.PDF
Report Locat http://www.ei	nergy.ca.gov/2009pu	ublications/CEC	-500-2009-009/C	CEC-500-2009-00	09.PDF
Report Local http://www.el	nergy.ca.gov/2009pt			CEC-500-2009-00	D9.PDF
Report Locat http://www.ei	nergy.ca.gov/2009pu	es and correctio	ns to:	EC-500-2009-00	09.PDF

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Agricultural sources of Project Description Compile PM10 and NH to ozone formation upw	PM10 and ozone prec	ursors easure concentrations of	VOC relevant to
Agricultural sources of Project Description Compile PM10 and NH to ozone formation upw	3 emission factors. Me	ursors easure concentrations of	
to ozone formation upw	3 emission factors. Me	easure concentrations of	VOC relevant to
Agricultural sources of Project Description Compile PM10 and NH to ozone formation upw	3 emission factors. Me	easure concentrations of	VOC relevant to
Project Description Compile PM10 and NH to ozone formation upw	3 emission factors. Me	easure concentrations of	VOC relevant to
Compile PM10 and NH o ozone formation upw			VOC relevant to
Compile PM10 and NH to ozone formation upw			VOC relevant to
to ozone formation upw			VOC relevant to
PI 1	rind and downwind of o	dairies	
	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	\$374,145
			·
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Parnell	Texas A&M	T drid Godreo Z	Amount
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Higashi	UC Davis	- una cource	7 6 6
Report Location			
Several publications, s	ee Related Info		
Related info 1			
	.gov/web/crisprojectpa	ges/192080.html	
http://www.reeis.usda	.g, c, cop . c ,c otpo	.g	
http://www.reeis.usda			
http://www.reeis.usda			
http://www.reeis.usda			
Related info 2			
Related info 2 Please provide pro	ject updates and corre Quality Planning and S		

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California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

23	Project Type Dairy Emissions Modeling	Status	Completed	Estimated Completion Date	June 2007
Project Name	9				

Developing a Process Based Model for GHG for California Dairies

Project Description

Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CEC PIER	\$119,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Salas	Applied		
	Geosolutions, LLC		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Zhang	UC Davis		

Report Location

http://www.arb.ca.gov/research/rsc/2-25-10/feb10adv.pdf

Related info 1

Funded with \$500,000 total - \$119,00 for Mitloehner portion

Related info 2

http://www.westerndairies.org/2009symposium/Mitloehner.pdf

California Air Resources Board **Emission Inventory Branch**

	Summary of A	gricultural E	missions Res	earch in Cali	fornia	a
Project ID 24	Project Type Livestock Ammonia Modeling	Status	Completed	Estimated Completion Date	2005	
Project Name						
Development	of a Process-Based A	mmonia Mode	I for Livestock So	ources		
Project Desc	ription					
	ocess-based model of a ations: dairy, beef, swin			pes of animal		
PI 1	Affiliation F	PI 1 F	und Source 1		Am	ount 1
G. Tonnesen			ADCO			250,000
PI 2	Affiliation F	PI 2 F	und Source 2		Am	ount 2

PI 3	Affiliation
R. Zhang	UC Davi

UC Riverside		
Affiliation PI 3	Fund Source 3	Amount 3
UC Davis		

Report Location

Z. Wang

http://www.epa.gov/ttnchie1/conference/ei14/session1/mansell.pdf

Related info 1
Other researchers - J. Fadel, R. Zhang, G. Mansell, J. Haasbeek.

Related info 2

Abstract on page 9 at: http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	March 2005
25	Dairy Emissions			Completion	
				Date	
		_			
Project Nam					
	t of an Air Module Curr	iculum for the	California Dairy	Quality Assuran	ce
Program (CE	JQAP)				
Project Desc	ription				
	iculum to assist produc	cers in meetin	g the new air qua	llity permit	
requirements					
PI 1	Affiliation		Fund Source 1		Amount 1
F. Mitloehne	UC Davis		US EPA		\$50,000
PI 2	Affiliation	PI 2	Fund Source 2		Amount 2
D. Meyer	UC Davis,				
- , -					1
21.0	A (()) - ()	DI O	F		A 1 O
PI 3	Affiliation	PI 3	Fund Source 3		Amount 3
M. Payne	CDQAP				
Report Loca	tion				
http://www.c	dqa.org/reports/annua	I_report_2005	.asp		
Related info					
http://www.	4cleanair.org/Documer	its/APCODete	ermination.pdf		
Related info	2				
L					
	rovide project updates				
	encer, Air Quality Plan	ning and Scie	nce Division		
jspencer	@arb.ca.gov				

916.324.2717

California Air Resources Board **Emission Inventory Branch**

	Summary of A	gricultural E	missions Res	search in Cal	ifornia
Project ID 26	Project Type Dairy Emissions	Status	Completed	Estimated Completion Date	December 2005
Project Name					
Laser-based	Sensors for Monitoring	j Ammonia Em	issions		
Project Desc	<mark>ription</mark> sensor based on fibre-a				
testing was p	reloped for measuring erformed in environme olstein cows were allov	ental chambers	at UC Davis wh	ere the excreta	
PI 1	Affiliation	PI 1 F	Fund Source 1		Amount 1
C. Patel	Pranalytic	a, Inc.	JSDA - SBIR I		\$20,000
PI 2	Affiliation	PI 2	Fund Source 2		Amount 2
F. Mitloehner	UC Davis				
PI 3	Affiliation	PI 3	Fund Source 3		Amount 3
Report Loca	tion				
http://www.p	ranalytica.com/pdf/MS	T-16-1547-200	5.pdf		

Related info 1 \$79,000 total; \$20,000 for Mitloehner portion

Related info 2

Institute of Physics Publishing, Meas. Sci. Technol. 16 (2005) 1547-1553

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Type Dairy Emissio		Status	Completed	Estimated Completion Date	December 2006
Project Name						
		lonitoring Am	monia Em	nissions		
Project Descr						
nas been dev esting was pe	eloped for me erformed in ei	easuring ambi	ient ammo chambers	nced photoacous onia in agricultura s at UC Davis wh late, providing a	al settings. Field ere the excreta	
기 1	A	ffiliation PI 1		Fund Source 1		Amount 1
C. Patel		ranalytica, Inc		USDA - SBIR II		\$75,000
기 2	A	ffiliation PI 2		Fund Source 2		Amount 2
Mitloehner	U	C Davis				
PI 3	A	ffiliation PI 3		Fund Source 3		Amount 3
Report Locat	ion					
http://www.pr	analytica.com	n/pdf/MST-16	-1547-200	05.pdf		
Related info	1					
\$350,000 (\$	75,000 for Mit	tloehner portio	on)			
Related info	2					
		updates and ality Planning				

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Ty		Status	Completed	Estimated	July 2005
28	Pig Welfar	re			Completion	
					Date	
Project Name	e					
Effect of Atm		mmonia on F	Pig Welfare			
Project Desc	ription					
Trace-gas se	ensor based			nced photoacoust		
				a in agricultural so C Davis where the		
				iding a source of		
			, p	.ag a 55a.55 5.		
PI 1		Affiliation F	01.1	Fund Source 1		Amount 1
F. Mitloehner	,	UC Davis		National Pork B	oard	\$40,000
. WILLOCITICI						
PI 2		Affiliation F	12	Fund Source 2		Amount 2
PI 3		Affiliation F	13	Fund Source 3		Amount 3
Report Loca	tion					
http://www.a	asv.org/sha	ap/issues/v1	5n3/v15n3p	137.pdf		
'	0	•	•	•		
Related info	n 1					
rtolatoa li lic	<u>, , , , , , , , , , , , , , , , , , , </u>					
Related info	2					
		ect updates a				
	encer, Air (@arb.ca.go		ing and Scie	ence Division		
916.324.						

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

29	Project Type Dairies, Worker Exposure	Status	Completed	Estimated Completion Date	September 2011
Project Name)				
Respiratory E	xposures and Health o	f Workers on 0	California Dairie	es (NIOSH)	
Drainet Dane	rinting				
Project Desci	•				
Monitor expos	sures of 200 dairy work	ers at large da	iries to dust an	d ammonia to de	fine

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	NIOSH	\$1,700,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Schenker	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bennett	UC Davis		

Report Location

problems.

http://factsreports.revues.org/492

Related info 1

UC Davis' program - CA Dairy Environ Health Research Inititative (Cal-DEHRI)

the concentrations of any airborne pollutants highly associated with respiratory

Related info 2

Field phase in progress, June 2008

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type		Status	Completed	Estimated	February 2006
30	Pesticide \				Completion	
	Emissions				Date	
Project Nam				1 (15 (: 1		
nvestigation	of Atmospr	neric Ozone	Impacts of S	elected Pesticide	es	
Project Desc	ription					
		timating and	quantifying of	ozone impacts fo	r selected pestic	ide
compounds	for which su	ich estimates	s are not cur	rently available.		
DI 4		Affiliation P	01.1	Fund Source 1		Amount 1
P <mark>I 1</mark> W. Carter		UC Riversi		ARB		\$100,000
w. Carter		OC Kiversi	ue	AILD		Ψ100,000
PI 2		Affiliation P		Fund Source 2		Amount 2
. Malkina		UC Riversi	de			
PI 3		Affiliation P	13	Fund Source 3		Amount 3
Report Loca	ation					
Report Loca	ttioi i					
Report of Ja	an. 10, 2007	available at	: http://www.	arb.ca.gov/resea	rch/apr/past/04-3	334.pdf
						-
Related info	o 1					
Related info	n 2					
I CIALGU IIII	<i>,</i> <u> </u>					
			and correctio			
			ning and Scie	nce Division		
jspencer	·@arb.ca.go	V				

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 31 Pestici Emissi	de VOC	Status	Completed	Estimated Completion Date	August	2008
Project Name						
Agricultural Pesticide Potential	VOC Sources a	ınd their Pho	tochemical Ozon	e Formation		
Project Description						
mprove current und from agricultural pes				potential of VO	Cs	
PI 1	Affiliation Pl	1	Fund Source 1		Amou	ınt 1
R. Flocchini	UC Davis		USDA			0,000
PI 2	Affiliation Pl	2	Fund Source 2		Amou	ınt 2
R. Higashi	UC Davis					
PI 3	Affiliation Pl	3	Fund Source 3		Amou	ınt 3
M. Kleeman	UC Davis					
Report Location						
http://www.reeis.usc	la.gov/web/crispi	ojectpages/2	204179.html			
Related info 1						
http://airquality.ucda	avis.edu/pages/e	vents/2008/c	green_acres/GRE	EN.pdf		
Related info 2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	2005
32	Fumigant B	Emissions			Completion	
	Mitigation				Date	
Project Name	2					
Commercializ		ermittent Wa	ater Sealing			
			· ·			
Project Desc	rintion					
		anagement	strategies for	water sealing co	mmercial-scale	
application of			Ů	Ů		
PI 1		Affiliation F)I 1	Fund Source 1		Amount 1
D. Sullivan		Sullivan		USDA		\$78,000
		Environme	ntal			
PI 2		Affiliation F	1 2	Fund Source 2		Amount 2
H. Ajwa		UC Davis				
PI 3		Affiliation F	13	Fund Source 3		Amount 3
J. Radewald		UC Davis				
Report Loca	tion					
http://www.c	cioncodiroc	t com/scion	oo/articlo/pii/	S0045653508003	2012	
nitp.//www.s	cienceanec	t.COIII/SCI C III	ce/article/pii/	30043033306003	5913	
Related info						
http://mbao.	.org/2005/M	IBAO%2020	105%20pdfs/	Preplant/8/Sulliva	ın.pdf	
	_					
Related info) 2					
Diverse		- 1 - 1 - 1 - 1 -				
			and correction	ns to: nce Division		
Janet Sp	onicor, An G	xuality i laili	ing and odle	TICC DIVISION		

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

33 Soi	oject Type ill Ammonia nissions	Status	Completed	Estimated Completion Date	December 2005
Project Name					
	vide Estimates of A	mmonia Emiss	ions from Native	Soils in Califor	nia
Project Description	ion				
	nia specific ammoni	a emission fac	tors and modeling	g for native soil	S
PI 1	Affiliation	PI 1	Fund Source 1		Amount 1
C. Krauter	CSU Fres		ARB		\$200,000
PI 2	Affiliation	PI 2	und Source 2		Amount 2
C. Potter	NASA Am				
PI 3	Affiliation	PI 3	Fund Source 3		Amount 3
S. Klooster	CSU Mon	terey			
Report Location http://www.epa.g	gov/ttn/chief/confer	ence/ei12/part/	krauter.pdf (2003	3)	
Related info 1					
http://geo.arc.na	asa.gov/sge/casa/r	egional/califorr	iia.html		
Related info 2					
	ide project updates cer, Air Quality Plan rb.ca.gov				

916.324.2717

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated	June 2005
34	Crop Ammonia			Completion	
	Emissions			Date	

Project Name

Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser

Project Description

Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$296,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	\$148,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Unisearch	\$148,000

Report Location

Partial, 2005 EPA conference. http://www.epa.gov/ttn/chief/conference/ei14/index.html (search Krauter)

Related info 1

http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project Name Cotton Gin PM Emissions Research, contract 09-01PM Project Description Evaluate the accuracy of US EPA's sampling methods which may significantly overestimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA. PI 1 D. Whitelock Affiliation PI 1 ARS - SW Cotton Ginning Research Ginning Research DK State Univ. Affiliation PI 3 Cotton Ginning Research Unit, PI 3 Cotton Ginning Research Unit, Report Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/# Related info 1 Related info 2	Project ID 35 FRM Sa Methodo	mpling	Status	Completed	Estimated Completion Date	Decemb	per 2012
Project Description Evaluate the accuracy of US EPA's sampling methods which may significantly overestimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA. Affiliation PI 1	Project Name						
Evaluate the accuracy of US EPA's sampling methods which may significantly oversistimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA. Affiliation PI 1	Cotton Gin PM Emissi	ons Research, co	ntract 09-0	D1PM			
Affiliation PI 2 OK State Univ. Affiliation PI 3 Cotton Ginning Research Unit, Box Support Location Report Location Related info 1	Project Description						
ARS - SW Cotton Ginning Research PI 2 M. Buser Affiliation PI 2 OK State Univ. Affiliation PI 3 Cotton Ginning Research Unit, Report Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#	estimate PM emission dispersion models for	s (CTM-039, P 2. PM10, PM2.5, tot	5 Stack Sa al suspend	ampling Method).	Develop PM		
ARS - SW Cotton Ginning Research ARS - SW Cotton Ginning Research Affiliation PI 2 OK State Univ. Affiliation PI 3 Cotton Ginning Research Unit, Report Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#	DI 1	Affiliation PI 1		Fund Source 1		Amoi	ınt 1
M. Buser OK State Univ. ARB \$45,000 Affiliation PI 3 Cotton Ginning Research Unit, Report Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#		ARS - SW Co	tton	Various cotton inc			
Affiliation PI 3 C. Boykin Cotton Ginning Research Unit, Report Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#	ગ 2	Affiliation PI 2	i	Fund Source 2		Amou	ınt 2
Cotton Ginning Research Unit, See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#	1. Buser	OK State Univ	·	ARB		\$4	5,000
Cotton Ginning Research Unit, Seport Location See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/#	Y 3	Affiliation PI 3	ı	Fund Source 3		Amou	ınt 3
See Presentations, Cotton Gin PM Study Update at: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/# Related info 1	C. Boykin			SJVAPCD			
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/air/taskforce/# Related info 1	Report Location						
					ce/#		
Related info 2	Related info 1						
Related info 2							
	Related info 2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 36	Project Type Crop PM Emissions	Status	Completed	Estimated Completion Date	2011
				Dato	
Project Name					
Particulate M	atter Emissions from I	Raisin Harvest			
Project Desc					
Compare PM ray, dried on	emissions of raisin havine.	arvesting techr	iques: conventio	nal tray, continu	lous
51. 4	A ##:lighting	DI 4	Fund Course 1		Amount 1
<mark>PI 1</mark> Alex Alexand	rou Affiliation CSU Fres		Fund Source 1 USDA-NRCS		Amount 1 \$0
Alex Alexanu	100		OODA WILOU		ΨΟ
기 2	Affiliation	PI 2	Fund Source 2		Amount 2
C. Krauter	CSU Fres		SJVAPCD		\$0
기 3	Affiliation		Fund Source 3		Amount 3
S. Ashkan	CSU Fres	no			\$0
Report Loca	tion				
•					
Under reviev	v by SJVAPCD, April 2	2012			
	,				
Related info) 1				
Related info	2				
	rovide project updates				
	encer, Air Quality Plar @arb.ca.gov	ining and Scier	nce Division		
916.324.	2717				

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	9	Status	Completed	Estimated	2010
37	Conservatio	n			Completion	
	Managemer	nt			Date	
	Practices					
Project Name	Э					
		ssions Red	uctions Achie	ved by Lower E	mitting Agricultu	ral
Practices				·	0 0	
Project Desc						
				D Conservation	Management	
Practices for	PM (conserv	ation tillage	and combin	ed operations)		
PI 1		Affiliation P		Fund Source 1		Amount 1
US EPA RAF	≀E Study			JS EPA RARE		
PI 2		Affiliation P	12	Fund Source 2		Amount 2
112		Annadon		JSDA		Amount 2
				JODA		
PI 3		Affiliation P		Fund Source 3		Amount 3
				SJVAPCD		
Donart Loop	tion					
Report Loca	lion					
Available as	ndf via searc	ch terms fro	m cfpub.eap	dov		
, tranable as	pai via obaic	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	o.pab.oap	.901		
D 1 (1: (4					
Related info) 1					
Related info	2					
			nd correction			
Janet Sp	encer, Air Qι	uality Plann	ing and Scier	ice Division		
ichoncor	@arh ca dov					

916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Ty			Status Completed		October 2007	
39	Pesticide \				Completion		
	Emissions				Date		
roject Name							
PR Round-	Robin VOC	Study					
Project Desc	ription						
		ove VOC em	nission estim	nates for solvents	s in pesticide		
				field conditions to		in in	
				zone production o			
				spraying is NOT			
			el. To decre	ase ozone, NOx	reduction more		
mportant tha	n VOC red	uction.					
						_	
기 1		Affiliation PI 1		Fund Source 1		Amount 1	
P. Green		UC Davis		USDA-CSREES		\$0	
기 2		Affiliation PI 2		Fund Source 2		Amount 2	
임 3		Affiliation PI 3		Fund Source 3		Amount 3	
10		Aimation	13	Turia Oddrec 5		Aillo	unt 5
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		ect updates	and correcti	ons to:			

jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

		g. 10 cc. =			•
	oject Type	Status	Completed	Estimated	December 200
	il VOC Emissions			Completion	
Mit	tigation			Date	
Project Name					
ARB Contract 0	5-351, Reducing Er	nissions of VC	OCs from Agricul	tural Soil Fumig	ation
Project Description	on				
	us extension: Devel				ons
	atory, field plot and cale field experimer				
previous large-sc	Jaie neiu expeninei	its on several	emission reduct	ion strategies	
PI 1	Affiliation I	PI 1	Fund Source 1		Amount 1
Scott Yates	UC Rivers		ARB		\$200,000
PI 2	Affiliation I	기 2	Fund Source 2		Amount 2
Jay Gan	UC Rivers	ide	USDA-ARS		\$100,000
PI 3	Affiliation I		Fund Source 3		Amount 3
M. Majewski	UC Rivers	ide			
Report Location					
http://www.arb.c	a.gov/research/apr	/past/05-351.r	odf		
.,	3-1-1-1	.,			
Doloted into 1					
Related info 1 ARB agreemen	nt 05-351				
, and agreemen	1. 00 00 1				
Related info 2					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	August 2001
41	Dairy & Feedlot			Completion	_
	Emissions			Date	
					J
Project Name					
Sources and	Sinks of PM10 in the S	San Joaquin V	'alley		
Project Desc	rintian				
	field PM10 emissions.	Evaluate PM:	10 and ammonia	emissions for	
feedlots and		L valuate 1 W	ro ana ammonia	01110010110 101	
PI 1	Affiliation	PI 1	Fund Source 1		Amount 1
R. Flocchini	UC Davis		USDA		
PI 2	Affiliation	PI 2	Fund Source 2		Amount 2
T. Cassel	UC Davis	1 1 2	T dila Oddioo 2		7 (IIIOGITE 2
040001	o o barro				
D. 0	A COULT AT	DI G	- 10 0		
PI 3	Affiliation	PI 3	Fund Source 3		Amount 3
Report Loca	tion				
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nttp://www.a	rb.ca.gov/research/api	reports/i2022	z.par		
Deletedint	4				
Related info) 1				
Related info	2				
Please	rovide project updates	and correction	ns to:		
	encer, Air Quality Plan				
•	@arb ca gov	imig and oole	TIOS DIVISION		

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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	roject Typ		Status	Completed	Estimate		mber 2004
	Soil Ammor	nia			Completi	ion	
E	missions				Date		
Project Name	ntom. Cotin			iana fuana Natio	a Caila and C	Nh a mai a a l	
Statewide invei Fertilizers in C		nates of Am	imonia Emiss	ions from Nativ	e Soils and C	nemicai	
rendizers in C	allionna						
Project Descrip	otion						
		nonia emiss	ions from agr	icultural fertilize	r application	and	
natural soils. R	Report ava	ilable at: ftp	://ftp.arb.ca.g	ov/carbis/report	s/l522.pdf		
PI 1		Affiliation P		Fund Source 1			ount 1
C. Krauter		CSU Fresn	0	ARB		\$	186,425
PI 2		Affiliation P	12	Fund Source 2		Amo	ount 2
C. Potter		NASA Ame	s	NASA Ames			
PI 3		Affiliation P	12	Fund Source 3		Λm	ount 3
S. Klooster		CSU Monte		Fulla Source S		AIII	Julit 3
S. Kloostei		CSO MONE	iley				
Report Location	on						
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http://www.cdf	a.ca.gov/is	s/ffldrs/frep/ _[pats/complete	edprojects/00-0	515Krauter20	J06.pdf	
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Related info 1							
Related info 2	<u> </u>						
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			and correction				

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	June 1996
43	Dairy Emissions			Completion	
				Date	
Duningt Name	_				
Project Name	e Measurement of PM	In Draguegoe C	ampaunda fram	Doin/ Industry	
Livestock Wa		io Piecuisoi C	ompounds nom	Daily illuustry	
LIVESTOCK VV	2310				
Project Desc					
Using enviro	nmental flux chambers	, evaluate dairy	ammonia and	ROG emissions	
PI 1	Affiliation	PI 1 F	Fund Source 1		Amount 1
C. Schmidt	Consultan		South Coast AQ	MD	
PI 2	Affiliation	PI 2	Fund Source 2		Amount 2
112	rimation	12	and Cource 2		7 tilloditt 2
PI 3	Affiliation	DI 3	Fund Source 3		Amount 3
113	Amiation	13	dia Source 5		Amounts
Report Loca	tion pa.gov/ttn/chief/confer	ence/ei14/sess	sion1/schmidt.pc	lf	
Related info) 1				
	aqmd.gov/rules/propos	ed/pr1127.htm	I		
	aqa.gov/raios/propos	03/pr 1/2/	•		
Related info	2				
http://www.e	epa.gov/ttn/chief/confe	rence/ei14/ses	sion1/schmidt.p	df	
Please n	rovide project updates	and correction	s to:		
	encer Air Quality Plan				

jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Type	Status	Completed	Estimated	January 1995
44	Dairy Emissions			Completion Date	
		,			
Project Name				1	
Results of the	Measurement of Vola	tile Organic C	ompounds from	Livestock Wast	es
Drainet Deseri	ntion				
Project Descrip Evaluate proce	ption ess specific VOCs fror	n dairies in th	e Sacramento re	egion.	
PI 1	Affiliation F	71.1	Fund Source 1		Amount 1
C. Schmidt	Consultant		US EPA		7411041111
PI 2	Affiliation F	'l 2	Fund Source 2		Amount 2
PI 3	Affiliation F	713	Fund Source 3		Amount 3
Report Location	on				
Related info	1				
	leanair.org/Documen	ts/APCODete	rmination.pdf		
	-				
Related info	2				
L					
Please pro Janet Sne	ovide project updates a ncer, Air Quality Planr	and correction ning and Scier	is to: nce Division		
jspencer@	arb.ca.gov	g 2 00.01			
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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	January 2002	2
45	Dairy Emis	sions			Completion Date		
					_ 4.0		
Project Name							
Survey Curre	nt Livestock	Waste Man	agement Pr	actices in the So	uth Coast Air Ba	asin	
Project Desc							
Evaluate mar	nure manag	ement praction	ces in the S	CAQMD			
임 1		Affiliation PI	1	Fund Source 1		Amount 1	
Egigian-Nich	ols	Tetra Tech I	nc	South Coast AQI	MD		
						_	
기 2		Affiliation PI	2	Fund Source 2		Amount 2	
기 3		Affiliation PI	3	Fund Source 3		Amount 3	
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Report Loca	tion						
http://www.a	amd.aov/rul	les/support.ht	tml#r1127				
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Disease		- (l	1			
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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ	oe	Status	Completed	Estimated	March 2003
46	Dairy Emis	sions			Completion	
					Date	
Project Name						
				ck Waste Mana	gement Practice	S
Survey and C	Control Option	on Assessm	ent			
Project Desc	rintion					
		e managem	ent and contr	ol options.		
nttp://www.ad	amd.gov/rul	es/proposed	/pr1127.html			
•	. 0		•			
			, ,			
PI 1		Affiliation P		Fund Source 1		Amount 1
Egigian-Nich	ols	Tetra Tech	Inc	South Coast AQ	MD	[
						<u> </u>
PI 2		Affiliation P	12	Fund Source 2		Amount 2
12		Aimation	1 2	and Cource 2		Amount 2
PI 3		Affiliation P	13	Fund Source 3		Amount 3
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http://www.a	qmd.gov/ru	les/support.h	ntml			
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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Ty	pe	Status	Completed	Estimated	March 2003
47	Dairy Emis	ssions			Completion	
					Date	
Project Name		N 4	. Desetions F	Σl ' Δ	-:1)(00-	
				Reducing Ammor		
INGSTOCK AND	isie ivialiay	jemem Fraci	ices Survey a	and Control Option	on Assessment	
Project Desc						
		es to reduce				
nttp://www.ac	md.gov/rul	les/proposed	l/pr1127.html			
임 1		Affiliation P		Fund Source 1		Amount 1
Egigian-Nich	ols	Tetra Tech	Inc	South Coast AQ	MD	
기 2		Affiliation P	1 2	Fund Source 2		Amount 2
의 3		Affiliation P	1.3	Fund Source 3		Amount 3
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jspencer	@arb.ca.go		-			
916.324.	2717					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Est	imated	December 2003
48 Dairy Emissions			Co	mpletion	
			Dat	te	

Project Name

Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership

Project Description

Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).

PI 1 B. Auvermann	Affiliation PI 1 TAMU CEC	Fund Source 1 National Center for Manure and Animal Waste	Amount 1 \$12,000
PI 2 W. Harman	Affiliation PI 2 TAMU CEC	Fund Source 2	Amount 2
PI 3 D. Meyer	Affiliation PI 3 UC Davis	Fund Source 3	Amount 3

Report Location

http://www.epa.gov/ttnchie1/conference/ei14/session1/sweeten_pres.pdf

Related info 1

http://ag.arizona.edu/ANS/swnmc/Proceedings/2006/Auvermann_SWNMC2006.pdf

Related info 2

http://amarillo.tamu.edu/library/files/brent_auvermann_publications/conference_procee dings/preliminaryevaluation_18.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Project Typ Dairy Emiss		Status	Completed	Estimated Completion Date	May 20	006	
Project Name)							
Evaluating Da		Emissions	Using Flux	Chambers				
Project Description								
Using environmental flux chambers at a working dairy, evaluate relative emission levels of individual process including lagoons, flush lanes, and corrals.								
PI 1		Affiliation PI	1	Fund Source 1		Amo	ount 1	
C. Schmidt		Contractor		ARB		\$	550,000	
PI 2		Affiliation PI	2	Fund Source 2 SJVAPCD		Amo	ount 2	
PI 3		Affiliation PI	3	Fund Source 3		Amo	ount 3	
Report Location Phase II Tech Memo at: http://www.arb.ca.gov/ag/caf/SchmidtDairyTestData2005.pdf								
Related info 1 http://www.4cleanair.org/Documents/APCODetermination.pdf								
Related info 2 http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf								
Please pr	Please provide project updates and corrections to:							

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 50	Project Typ Dairy Emis		Status	Completed	Estimated Completion Date	December 2005
Project Name	<u>;</u>					
		nissions in a	an Environme	ental Chamber		
Project Descr						
				amber and evalua esh waste produc		OC
PI 1		Affiliation P	1 1	Fund Source 1		Amount 1
F. Mitloehner		UC Davis		US EPA		\$75,000
PI 2		Affiliation P	12	Fund Source 2		Amount 2
R. Flocchini						
PI 3		Affiliation P	13	Fund Source 3		Amount 3
J. Peters						
Report Location http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf						
Related info		g/Document	s/APCODete	ermination.pdf		
Related info	2					
J Environ Q		622 (2008)				
Please pr	rovide proje	ct updates a	and correction	ns to:		

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Sta Emissions	tus	Estimated Completion Date	2006
Project Name				
	Amine, and Phenol Em	issions from Cows and th	heir Waste	
Project Description				
Compounds were m chamber.	neasured from dry and la	actating Holstein cows in	an environmental	
PI 1	Affiliation PI 1	Fund Source 1	An	nount 1
F. Mitloehner	UC Davis	ARB		\$200,000
PI 2	Affiliation PI 2	Fund Source 2	An	nount 2
S. Trabue	USDA ARS			
PI 3	Affiliation PI 3	Fund Source 3	An	nount 3
J. Koziel	ISU			
Report Location				
http://www.arb.ca.g	ov/ag/caf/MitloehnerDai	ryChamberEmissions20	06.pdf	
Doloted info 1				
Related info 1 http://www.4cleana	air.org/Documents/APC0	Determination.pdf		
Related info 2				
	ls.org/cgi/content/full/37/	2/615		

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Statu	IS	Completed		Estimated	June 2004	
52	Almond Harvest					Completion		
	Emissions					Date		
Duning t Name	_							
Project Name	e t of PM10 emissi	an factors for all	mono	l harvosting				
improvemen	tor Fivi to ettiissii	on factors for all	ПОПС	inarvesting				
Project Desc								
	ng PM10 emissio				ma	ites based on		
measured Pi	M10 during almor	nd sweeping and	d bick	c up.				
l								
l								
l								
PI 1		ation PI 1		und Source 1			Amount 1	
R. Flocchini	UC I	Davis	P	almond Board of	f Ca	alifornia		
PI 2		ation PI 2	F	und Source 2			Amount 2	
C. Parnell	Texa	as A&M						
PI 3	Affili	ation PI 3	F	und Source 3			Amount 3	
Report Loca	tion							
http://caaqes	s.tamu.edu/Public	cations/Publication	ions/l	PU01107.pdf				
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intp://asac.i	Tyrraiti.com/abst	1401.43p : 414-20	,000	x(-2				
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	rovide project up							
	encer, Air Quality @arb.ca.gov	Planning and S	cien	ce Division				
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California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Estimated	July 2007
53 Dairy Emissions			Completion	
			Date	

Project Name

Photochemical Ozone Formation Potential of Agricultural VOC Sources

Project Description

Some recent estimates predict that dairy cattle are second only to on-road vehicles as a leading source of ozone precursor emissions in California's San Joaquin Valley. The objective of this work was to directly measure the ozone formation potential from dairy housing.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Green		USDA	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Flocchini			

Report Location

http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH3-4S0YXTM-2&_user=1928924&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_version=1&_urlVersion=0& userid=1928924&md5=e020b1203499a23d500c0127b4460438

Related info 1

presentation at CDPR, date unknown:

http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf

Related info 2

Alternate site for report: Go to http://dx.doi.org and enter "doi:10.1016/j.atmosenv.2008.02.064"

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	May 2005
54	Broiler Emissions			Completion	
				Date	
Project Name	2				
	roiler Emissions in Tu	unnel Ventilated	d Housing		
Project Desc	ription PM10, ammonia and	d araania aaaa		d pariadically du	rin a
	oultry production cycle				iling
between brod		o morading to c	ayo or production	rana ro dayo	
l					
DL4	V tt:1: 0 t; 0 t;	DI 1	Fund Course 4		Amount 1
PI 1	Affiliation CDFA	IPII	Fund Source 1 California Poultry	/ Fodoration	Amount 1 \$40,000
M. Summers	CDFA		Calliornia Foultry	y rederation	\$40,000
PI 2	Affiliation		Fund Source 2		Amount 2
D. Duke	Foster F	arms			
PI 3	Affiliation	n PI 3	Fund Source 3		Amount 3
Report Loca	tion				
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πιρ.//www.a	ib.ca.gov/ag/cai/poui	emsipt.pui			
Related info	1				
Related info	2				
Pleasen	rovide project update	s and correction	ns to:		
	encer, Air Quality Pla				
	@arb.ca.gov	.5			

916.324.2717

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID Project Type	Status	Completed	Estimated	December 2005
55 Dairy Emissions		-	Completion	
			Date	

Project Name

Evaluating Dairy Reactive Organic Gas Emissions

Project Description

Chemically speciate ROG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes. Further study continues in 2005-2008 (project IDs 6, 7, 8).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	CSU Foundation	\$20,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location

http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf

Related info 1

http://www.4cleanair.org/Documents/APCODetermination.pdf

Related info 2

http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	September 2008
56	Dairy Waste		-	Completion	
	Management			Date	

Project Name

ARB Contract 08-279, Dairy Wastewater Treatment Feasibility Study

Project Description

Assess the feasibility of applying standard wastewater treatment technology to the management of

manure from cows in typical California dairies. EPA plans to incorporate this information into its on-going

assessment of technologies for dairy manure management.

PI 1 Trygve Lundquist	Affiliation PI 1 Cal-Poly SLO	Fund Source 1 US EPA	Amount 1 \$19,936
PI 2	Affiliation PI 2	Fund Source 2	Amount 2 \$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3 \$0

Report Location

(When available) http://www.epa.gov/region09/ag/dairy/technologies.html

Related info 1

http://www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm

Related info 2

http://works.bepress.com/tlundqui/2/

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	June 2011
57	Soil VOC Emissions		-	Completion	
	Mitigation			Date	

Project Name

Reducing Emissions of VOCs from Agricultural Soil Fumigation: Comparing Emission Estimates from Simplified Methodology, ARB contract 07-332

Project Description

For a single soil, determine the extent to which laboratory and modeling studies can simulate field emission data. Extend the range of emission reduction strategies assessable in the field using the laboratory and modeling approaches. Variables under investigation include columns/furrows, with tarped/untarped, VIF vs. HPDE covered beds/furrows.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Scott Yates	USDA-ARS-	ARB	\$100,000
	Riverside		
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Daniel Ashworth	USDA-ARS	DPR	\$50,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

http://www.arb.ca.gov/research/rsc/10-28-11/item4dfr07-332.pdf

Related info 1

ARB agreement 07-332

Related info 2

USDA project 5310-12130-008-05

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimate		ry 2010
58	Compost E	missions			Complet	ion	
					Date		
Project Name							
Emission of C	GHGs Resu	Iting from G	reenwaste C	composting (09-	01 CCOS)		
Project Desci							
				onia, nitrate, nit			
				ore of the windr analyze sample			
dioxide, nitro					3 Ioi illetilaile	, carbon	
			·	•			
PI 1		Affiliation P)I 1	Fund Source 1		Δm	ount 1
Fatih Buyuks	onmez	UC San Die		SJVAPCD			198,000
aun Bayako	OTITIOZ		- 9-				
기 2		Affiliation P	12	Fund Source 2		Amo	ount 2
. –			-			7	\$0
PI 3		Affiliation P	13	Fund Source 3		Amo	ount 3
							\$0
Report Locat	tion						
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STUDY-REF		a/pto/cimissi	on_ractors/c	ontena, ontena,	Joinposting/i	IIVAL OOM	1001
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Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID 59	Project Type NAEMS: Layer Emissions	Status	Completed	Estimated Completion Date	July 2010
Project Name	е				
NAEMS Proj	ect: Air Emissions from	California Lay	er Farms (NAE	MS CA2B)	

Project Description

This project is for conducting a two-year measurement and monitoring of air emissions from a layer farm in CA. The emissions from two mechanically ventilated layer houses are measured. The houses have approximately 68,000 hens in cages. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information and data are collected on ventilation, indoor and outdoor environmental

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	Ag Air Research Council	\$199,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0
interim site data: http	o://www.epa.gov/airqual	lity/agmonitoring/data.html	
interim site data: http	o://www.epa.gov/airqual	lity/agmonitoring/data.html	
Related info 1	o://www.epa.gov/airqual	lity/agmonitoring/data.html	
Related info 1	o://www.epa.gov/airqual	lity/agmonitoring/data.html	
Related info 1		lity/agmonitoring/data.html	
Related info 1 Data under review/c		lity/agmonitoring/data.html	

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	July 2010
60	NAEMS: Bi Emissions	roiler			Completion Date	
					2 6.10	<u> </u>
Project Name			0 11/4 1 1 1	()		
NAEMS Proj	ect: Air Emis	ssions from	California B	roiler Farms (N <i>i</i>	AEMS CA1B)	
Project Desc						
					itoring of air emis	sions
				e about 42,000	ventilated broiler broilers in each	
					nonia, hydrogen	
					organic compoun	
total suspend	ded particula	ites, PM2.5	and PM10.	In addition, the	detailed informati	on
PI 1		Affiliation F	1 1	Fund Source 1		Amount 1
R. Zhang		UC Davis		Ag Air Researd		\$219,000
PI 2		Affiliation F	1 2	Fund Source 2		Amount 2
						\$0
PI 3		Affiliation F	PI 3	Fund Source 3		Amount 3
						\$0
Report Loca	ition					
http://www.e	pa.gov/airqu	uality/agmor	nitoring/tech	docs.html		
			-			
Related info	o 1					
Related info	2					

California Air Resources Board **Emission Inventory Branch**

Sı	ummary of Aq	gricultural E	missions Re	search in Cal	ifornia
Project ID 61 Soil No Asses	Ox Emissions	Status	Completed	Estimated Completion Date	November 2013
Project Name					
ARB Contract 09-32 Dairy Systems	5, Assessment o	of Baseline Ni	trous Oxide Emi	ssions in Califor	nia
Project Description					
N2O emissions will lestanislaus County. The county of solid manure, lago calculation of the fractoristic emission factoristics.	The N2O flux will N2O emissions voon water, and suction of applied	be measured will be calcula ynthetic fertili	d intensively, usinted. The annual zer will be accou	ng static chamb N inputs in the f inted for to enab	orm
	A court of F				
<mark>PI 1</mark> William Horwath	Affiliation F UC Davis		Fund Source 1 ARB		Amount 1 \$82,000
Pl 2	Affiliation F		Fund Source 2 EDF		Amount 2 \$100,000
PI 3	Affiliation F	PI 3	Fund Source 3		Amount 3 \$0
Report Location					
http://arb.ca.gov/res	search/apr/past/0	09-325.pdf			
related fille 1					

Please provide project updates and corrections to: Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 62	Project Ty Soil NOx I		Status	Completed	Estimated Completion	Nove	mber 2013	
02	Assessme				Date			
Project Name	е							
ARB Contrac	t 09-329, D	etermining N	Nox Emissior	ns from Soil in Ca	lifornia Croppin	g		
Systems to Ir								
Project Desc	ription							
This is an add-on component to the three on-going baseline nitrous oxide (N2O)								
				pected to provide				
				and ozone mode				
including NO	x emission	s from the so	oil. See Proje	ct IDs 77, 78, 79	, & 81.			
PI 1		Affiliation F	YI 1	Fund Source 1		Am	ount 1	
William Horw	/ath	UC Davis		ARB			\$83,500	
PI 2		Affiliation F	PI 2	Fund Source 2		Amount 2		
M. Burger		UC Davis					\$0	
PI 3		Affiliation F	913	Fund Source 3		Am	ount 3	
							\$0	
Report Loca	tion							
https://www	arh ca gov	/research/an	r/past/09-329) ndf				
11ttp3://www.	arb.oa.gov/	researer/ap	179454705 020	r.pui				
Related info	1							
Related info	2							

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	May 2011
63	Biogenic VOC			Completion	
	Emissions			Date	

Project Name

ARB Contract 06-329, Flux Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley

Project Description

Develop BVOC simulation platform for central valley agricultural operations and test the modeling performance through ozone and aerosol nucleation event measurements. Micro-meteorological to landscape level emission flux measurement program for certain selected crops identified during the screening phase.

PI 1 Allen Goldstein	Affiliation PI 1 UC Berkeley	Fund Source 1 ARB	Amount 1 \$400,003
PI 2 John Karlik	Affiliation PI 2 UC Berkeley, Ag Extension	Fund Source 2	Amount 2 \$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3 \$0

Report Location

http://www.arb.ca.gov/research/rsc/06-09-11/agenda3_contract%2006-329_dfr_ash.pdf

Related info 1

http://www.arb.ca.gov/research/rsc/10-28-11/oct11book.pdf

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 64	Project Type Biogenic V Emissions		Status	Completed	Estimated Completion Date	June 20	013
Project Name	e						
		nprovina Re	gional Bioge	nic VOC Emissior	s Estimate Usi	na	
an Airborne F							
Project Desc	ription						
land cover da	atabases, w then ARB B	ith proper so	aling metho	uite of BVOC spec dology. The result ove the modeling	s of this project		
PI 1		Affiliation F	1 1	Fund Source 1		Amo	unt 1
Allen Goldste	ain	UC Berkele		ARB			00,000
Allen Goldste	ZII I	o d domon	,	, <u>.</u>		Ψ.	30,000
PI 2		Affiliation F		Fund Source 2		Amo	unt 2
Alex Guenthe	er	Natl Center Research	r Atm				\$0
PI 3		Affiliation F	13	Fund Source 3		Amo	unt 3
Halfidi Jonss	on	CIRPAS					\$0
Report Loca	tion						
http://nature	.berkeley.ed	du/ahg/pubs	/Goldstein_e	tal_CARB_2014.բ	odf		
Related info	1						
Related info	2						

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID 65 Project Type Dairy Emissions Mitigation	Status	Completed	Estimated Completion Date	December 2010
Project Name				
Removal of H2S from Biogas Microwave Technology, contri	•	ne Exhaust at a	Dairy Digester U	sing
Project Description				
T1 1 1 11 14 11	(() ()		1.0 1.0	

The project will monitor the performance of the H2S removal system and the NOx removal system on the biogas powered engine at the Tollenaar Holsteins Dairy Farm. Anaerobic digester gas (biogas) is captured from a heated, mixed digester and used to fuel a 212 kW Guascor engine-generator. H2S is currently removed from the biogas using an aerated water bubbler system (Soloscrub).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1			
Mark Rawson	SMUD	SMUD	\$246,309			
PI 2	Affiliation PI 2	Fund Source 2	Amount 2			
Chang Cha	Cha Corporation		\$0			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3			
Dan Greenberg	Applied Filter Technology		\$0			
Report Location						
http://www.energy.c	a.gov/2013publications/C	EC-500-2013-079/CEC-500-2013-0)79.pdf			

Please provide project updates and corrections to: Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

Related info 1

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	ject Type	Status	Completed	Estimated	2007
	migant Emissions igation			Completion Date	
	-gamen				<u> </u>
Project Name					
Reductions of Fu VIF)	migant Emissions ι	using Irrigation	and Virtually Im	penetrable Film	
Project Description					
	migant Emissions u hloropicrin, methyl l		and Virtually Im	penetrable Film	
PI 1	Affiliation P	PI 1	Fund Source 1		Amount 1
Steve Fennimore			JSDA-CSREES		\$0
PI 2	Affiliation F	PI 2	Fund Source 2		Amount 2
Husein Ajwa	UC Davis	S	Stawberry Comm	nission	\$0
PI 3	Affiliation F	PI 3	Fund Source 3		Amount 3
					\$0
Report Location http://www.ageco	on.ucdavis.edu/exte	ension/update/	/articles/v9n5_3.	pdf	
Related info 1					
Related info 2					
	de project updates a er, Air Quality Planr				

916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	2006
67	Fumigant Emissions			Completion	
	Mitigation			Date	
Project Name	<u> </u>	_			
	f Fumigant Emissions	using Irrigation	and Virtually Im	npenetrable Film	S
VIF)	Trumgant Emissions	doning mingdator	rana viitaany in	iporiotiable i iiii	
Project Desc	ription f Fumigant Emissions	ucina Irrigation	and Virtually In	ananatrahla Eilm	6
	D and Chloropicrin	using imgation	rand virtually in	ipenetrable i iiii	3
v.i. / 101 1,0	b and omoropionii				
	A COUL AL		- 10 1		
<u> </u>	Affiliation		Fund Source 1		Amount 1
Thomas Trou	ut USDA-AR	5			\$0
인 2	Affiliation		Fund Source 2		Amount 2
S. Gao	USDA-AR	S			\$0
ગ 3	Affiliation	PI 3	Fund Source 3		Amount 3
					\$0
Report Loca	tion				
	/ // // 0				
nttp://www.e	pa.gov/osp/hstl/AgCon	proceedings_	print.pat		
Related info	1				
rtolatoa lilic	, I				
Related info	. 2				
ixelated lillo)				
Die	and a made to the		- 1		
	rovide project updates				
	encer, Air Quality Plan @arb.ca.gov	ming and Scier	ICE DIVISION		
916.324.					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 68 Fumigant Mitigation	t Emissions	Completed	Estimated Completion Date	2007
Project Name Reductions of Fumigar (VIF)	nt Emissions using Irriga	tion and Virtually Im	permeable Film	s
	nt Emissions using Irrigat picrin and methyl bromid		permeable Film	s
PI 1 Husein Ajwa	Affiliation PI 1 UC Davis	Fund Source 1 UC Davis		Amount 1 \$0
PI 2	Affiliation PI 2	Fund Source 2		Amount 2 \$0
PI 3	Affiliation PI 3	Fund Source 3		Amount 3 \$0
286	ov/research/publications/	/publications.htm?S	EQ_NO_115=1	85
Related info 1 Related info 2				
	ject updates and correct Quality Planning and Sc			

jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 69	Project Type Fumigant Emissions Mitigation	Status	Completed	Estimated Completion Date	2007
Project Name	9				
	f Fumigant Emissions (using Irrigatio	า		
Project Desc					
Evaluation of	reductions in fumigant	emissions us	ing tarps; focus o	n 1,3-D.	
기 1	Affiliation F	PI 1	Fund Source 1		Amount 1
Husein Ajwa	UC Davis		UC Davis		\$0
기 2	Affiliation F	PI 2	Fund Source 2		Amount 2
					\$0
임 3	Affiliation F	인 3	Fund Source 3		Amount 3 \$0
Report Loca	org/2008/035Ajwa.pdf				
Related info	1				
Related info	2				
Janet Sp	rovide project updates encer, Air Quality Planr @arb.ca.gov 2717				

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 70 Soil Nox Modelin	Emissions	Status	Completed	Estimated Completion Date	May 20	014
Project Name						
ARB Contract 10-309	. Calibrating, va	alidating, and	implementing pro	cess models fo	or	
CA agriculture greenh						
Project Description						
Improve earlier attem CA conditions and est measure N2O flux and	imate N2O em	issions for C			s for	
PI 1	Affiliation F	11	Fund Source 1		Amo	ount 1
Changsheng Li	Univ New I	Hampshire	ARB			250,000
PI 2	Affiliation F	12	Fund Source 2		Amount 2	
William Salas	Applied GeoSolutio			\$0		
PI 3	Affiliation F	13	Fund Source 3		Amo	ount 3
					\$0	
Report Location						
http://www.arb.ca.gov	//research/rsc/	1-31-14/item	11dfr10-309.pdf			
Related info 1						
Related info 2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated	December 2015
71	Soil Nox Emissions		-	Completion	
	Mitigation			Date	

Project Name

ARB Contract 11-313, Evaluating Mitigation Options of Nitrous Oxide Emissions in California Cropping Systems

Project Description

Evaluate alternative management practices with greatest promise of reducing annual N2O emissions while maintaining productivity in lettuce, corn and tomatoes. Proposed strategies are: targeting fertilizer types and timing of their application, delaying nitrification by using urease and nitrification inhibitors, spatially decreasing the concentration of applied N fertilizer, and modifying irrigation methods.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
William Horwath	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Johan Six	UC Davis		\$0

Report Location

https://www.arb.ca.gov/research/apr/past/11-313.pdf

Related info 1

http://www.arb.ca.gov/research/single-project.php?row_id=65096

Related info 2

www.arb.ca.gov/ag/fertilizer/meetings/Proposal11-313.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 72 Conserve Manager	ation ment	Completed Estimated Completion Date	September 2011
Project Name MISTING: A Viable Co Generated by Disking	nservation Management	Practice For Reducing PM10	
Project Description Quantify and substanti attached to a common	ate PM-reducing potentia agricultural disk, as well of dsut plume, emission f	al of an existing DCU misting appa as other variables such as acotrs, night farming	ratus
PI 1 Alex Alexandrou	Affiliation PI 1 CSU Fresno	Fund Source 1 USDA-NRCS	Amount 1 \$210,651
PI 2 C. Krauter	Affiliation PI 2 CSU Fresno	Fund Source 2 ARI	Amount 2 \$420,000
PI 3 S. Ashkan	Affiliation PI 3 CSU Fresno	Fund Source 3	Amount 3
Report Location	gov/Internet/FSE_DOCU	MENTS/stelprdb1046764.pdf	
	g		
Related info 1			
Related info 2			

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Complete	d	Estimated	2010	
73	Almond Ha	rvest				Completion		
	Emissions					Date		
Duning Name								
Project Name		h on particu	late matter	emissions fro	m almo	and harvoet		
operations	eeping depti	ii oii particu	iale iliallei	emissions no	iii aiiiic	niu naivesi		
oporationo								
Project Desc								
			th on particu	ılate matter (F	PM) em	issions from		
sweeping an	а ріскар оре	i auons						
PI 1		Affiliation P	11 1	Fund Sourc	e 1		Amoı	unt 1
Brock Faulkr	ner	TAMU						\$0
PI 2		Affiliation P	12	Fund Sourc	e 2		Amo	unt 2
S. Capareda		TAMU		, and court	<u> </u>		7	\$0
•								·
PI 3		Affiliation P	13	Fund Sourc	e 3		Amoi	unt 3
		, timilation i		i dila Codio			7 11110	\$0
								·
Report Loca	ation							
report Loca	ttiO11							
http://www.a	atmospolres.	com/articles	s/Volume3/i	ssue2/APR-1	2-024.p	odf		
Related info	<u> </u>							
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Dalatad info	. 0							
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	rovide proje							
	@arb.ca.go\		iiig and Sci	ence Division				
916.324.								

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	, ,					
	Project Type Almond Harvest Emissions	Status	Completed	Estimated Completion Date	2009	
<mark>Project Name</mark> mproving PM	110 Emission Factors f	or Almond Sw	eeping and Harv	resting		
roject Descr	intion					
	nd sweeping and harve	sting emissior	n factors using di	ispersion model	ing	
ય 1	Affiliation F	의 1 F	Fund Source 1		Amount 1	
Brock Faulkn			Almond Bd of CA	\		60
기 2	Affiliation F	PI 2	Fund Source 2		Amount 2	
3. Goodrich	Trinity Cor	sultants			\$0	
PI 3	Affiliation F	PI 3	Fund Source 3		Amount 3	
S. Capareda	TAMU					60
Report Locat	ion					
http://www.al	monds.com/growers/re	esources/resea	arch-database			
Related info	1					,
	o.tamu.edu/Papers/Aln	nond/AnnualR	eport2010.pdf			
Related info	2					
Places pr	ovide project updates	and correction	s to:			

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	ре	Status	Completed	Estimated	2011
75 Almond Ha				Completion	
Emissions				Date	
Project Nome					
Project Name Particulate matter emiss	ion factors fo	r almond har	vest as a functi	on of harvester s	cheed
articulate matter emiss	non ractors to	i allilollu ilai	vest as a fulleti	on or narvester s	speed
Project Description		DM	1		•
Evaluate reduction in aln 5 mph to 2.5 mph usign					nom
임 1	Affiliation PI	1	Fund Source 1		Amount 1
Brock Faulkner	TAMU				\$0
인 2	Affiliation PI		Fund Source 2		Amount 2
3. Goodrich	Trinity Cons	ultants			\$0
인 3	Affiliation PI	3	Fund Source 3		Amount 3
/. Botlaguduru	TAMU				\$0
Report Location					
Abstract: http://www.tan	dfonline com	/doi/abs/10.3	155/1047-3289	59 8 943	
Louidon Intp.//www.tail		. 251/255/10.0		.00.0.0 10	
Related info 1					
Deleted info 2					
Related info 2					
Related info 2					
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jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	2011		
76	Almond Ha	rvest			Completion			
	Emissions				Date			
Dania at Nama								
Project Name		Poduco PA	1 Emissions f	rom Almond Ha	ryost Operation	c		
narvesurig E	quipinient to	Reduce Fil	/ [[[[[[[[[[[[[[[[[[[TOTTI AIITIOTIU FIA	rvest Operation	5		
Project Desc								
			nd harvesting	systems and re	trofit abatemen	t		
devices to er conventional		n a						
conventional	narvester							
PI 1		Affiliation P		Fund Source 1		Am	ount 1	
Brock Faulkr	ner	TAMU		USDA-NRCS			\$0	
PI 2		Affiliation P	1 2	Fund Source 2		Am	ount 2	
				SJVAPCD			\$0	
PI 3		Affiliation F	13	Fund Source 3		Am	ount 3	
							\$0	
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Not available	е							
D 1								
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			and correction					
			ing and Scie	nce Division				
Jspencer 916.324.	@arb.ca.go	V						
910.324.	. <u>_</u>							

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	ompleted	Estimated	June 2012
77 Soil NOx Emissions			Completion	
Assessment			Date	

Project Name

ARB Contract No. 08-324, Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems

Project Description

Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 78, 79 & 81.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	ARB	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3 CDFA	Amount 3

Report Location

http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf

Related info 1

See Project ID 62, contract 09-329, which is an add-on to study nitric acid

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ		Status	Completed	Estimated	2013
78	Soil NOx E				Completion	
	Assessmer	nt			Date	
Dunin at Name						
Project Name		Δεςρεεπρ	nt of Raselir	ne Nitrous Oxide a	and Nitric Oxide	
Emissions in					ind Millie Oxide	
Project Desci	ription					
evaluate flux began in June	emissions o e 2009. Me nard and alf	of N2O usin easuring nit	g typical fer rous oxide f	nethods on 4 sepa tilizer practices for lux in tomato, whe o emission factors	each crop. Wor at, lettuce, rice,	
PI 1		Affiliation F	1 1	Fund Source 1		Amount 1
Johan Six						\$500,000
DI O		A ((:): - (:	N 0	F		A 1 0
PI 2		Affiliation F	12	Fund Source 2		Amount 2 \$0
						ΨΟ
PI 3		Affiliation F	13	Fund Source 3		Amount 3
						\$0
Report Locat	tion					
http://www.a	rb.ca.gov/re	search/rsc/	05-11-12/ite	em4dfr08-324.pdf		
Related info	1					
Related info	2					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Typ Soil NOx E		Status	Completed	Estimated Completion	June 2013	
79	Assessme				Date		
Project Name							
		Nitrous Ox	ide Emission	s from California	Cotton (CDFA		
Contract)	_				·		
Project Desc							
				ethods on 4 sepa izer practices for		·k	
began in Jun	e 2009. M	easuring niti	rous oxide flu	ıx in tomato, whe	at, lettuce, rice,		
vineyard, orc IDs 62, 77, 7		falfa system	s to develop	emission factors	. See also Proje	ct	
100 02, 77, 7							
PI 1		Affiliation F	PI 1	Fund Source 1		Amount 1	
Dave Gooral	100	7 trimation 1		r and Course 1		\$150,00	
PI 2		Affiliation F	21 2	Fund Source 2		Amount 2	\$O
						•	5 U
PI 3		Affiliation F	7I 3	Fund Source 3		Amount 3	
						Ş	\$0
Danart Laga	tion						
Report Loca							
			odel; prelimin minars/n2o/g	ary report site: oorahoo.pdf			
Related info	o 1						
Related info	2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Project Type	Status	Completed	Estimated	March 2016
80 Dairy Emis	sions		Completion	
Mitigation			Date	

Project Name

ARB Contract 11-325, Quantification of the Emission Reduction Benefits of Mitigation Strategies for Dairy Silage

Project Description

Silage emissions include criteria pollutants (e.g. VOCs, NOx) and greenhouse gases. This project aims to quantify and model the effectiveness of various mitigation practices (such as maintaining a smooth pile face, storing silage in ag bags, etc.) on the various emissions species. Factors such as silage exposure surface area, temperature, air velocity, etc. will also be measured and analyzed.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Green	UC Davis		\$0

Report Location

http://www.arb.ca.gov/research/single-project.php?row_id=65102

Related info 1

Atmospheric Environment, 2010, 44:1989-1995; Atmospheric Environment, 2010, 44: 4172-4180; J. Environ. Qual. 2011, 40:1-9, Env. Sci. & Technol. 2010, 44: 2309-2314; Trans. ASABE. 2011, 53: 1-7

Related info 2

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID Proj	ject Type	Status	Completed	Estimated	December 2015
81 Soil	NOx Emissions		-	Completion	
Ass	essment			Date	

Project Name

Assessment of Baseline Nitrous Oxide Emission in Response to a Range of Nitrogen Fertilizer Application Rates in Corn Systems (CDFA Contract)

Project Description

Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 79.

PI 1	Affiliation PI 1 UC Davis	Fund Source 1 CDFA	Amount 1 \$92,542
Martin Burger	OC Davis	CDIA	Ψ92,542
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Horwath	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

http://www.cdfa.ca.gov/is/ffldrs/frep/pdfs/completedprojects/12-0453-SA113-615FRBurgerHorwath.pdf

Related info 1

www.cdfa.ca.gov/is/docs/12-0453-SABurger.pdf

Related info 2

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

Project ID Project T	ype	Completed	Estimated	March 2012
82 Soil Nox	Emissions		Completion	
Mitigation	1		Date	

Project Name

Assessing practices and influencing policy to mitigate nitrous oxide (N2O) emissions from California Agriculture

Project Description

Evaluate N2O mitigation potential of nitrogen management practices and N use efficiencies in important CA cropping systems.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	Packard Foundation	\$350,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Horwath	UC Davis		\$350,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location			
Not Available			

Related info 1

http://nitrogen.ucdavis.edu/research/nitrogen/documents

Related info 2

http://c-agg.org/cm_vault/files/docs/C-AGG_Presentation-2_29_2012_%28MFitzGibbon-ARB%29.pdf

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	Emissions	Completed	Estimated Completion	June 2013
Mitigation	n		Date	
Project Name				
	to improve soil properti	es and reduce N2O e	emissions	
Project Description				
equestration in a varie	tigating the influence of ety of crops. This study of orchards as compost.			
임 1	Affiliation PI 1	Fund Source 1		Amount 1
Johan Six	UC Davis	CEC		\$80,834
인 2	Affiliation PI 2	Fund Source 2		Amount 2
				\$0
인 3	Affiliation PI 3	Fund Source 3		Amount 3
				\$0
Report Location				
Preliminary: http://www	w.plantsciences.ucdavis	.edu/Agroecology/Ou	utreach/Walnut	html
Related info 1				
Related info 2				
	pject updates and correct			

Janet Spencer, Air Quality Planning and Science Division jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 84	Project Typ Compost E		Status	Completed	Estimated Completion	October 2015	5
					Date		
Project Name	9						
Compost Life		ysis					
Project Desc				ada atian and for		•	
		emissions in c ands, tomatoe			m applications o		
PI 1		Affiliation PI	1	Fund Source 1		Amount 1	
William Horw	rath	UC Davis		CalRecycle		\$450,000)
PI 2		Affiliation PI	2	Fund Source 2		Amount 2	
						\$0)
PI 3		Affiliation PI	3	Fund Source 3		Amount 3	
						\$0)
Report Loca	tion						
http://www.c		.gov/Publicati	ons/Docum	nents/1544%5C2	201501544.pdf		
Related info	2						
Janet Sp	encer, Air C @arb.ca.go	ct updates an tuality Plannin v					

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Dunio et ID	Ctatus	In Drawage Fating stad		
Project ID Project T 85 Dairy Em		In Progress Estimated Completion		
Mitigation		Date		
Duning the second				
Project Name Development of Metho	dology to Assess Dairy S	Silage Management Practices to		
	olatile Organic Compou			
Project Description				
	thodology to assess the	VOC emissions potential of silage	÷	
piles. Validate the meth	hodology with measurem	ents at different stages from ensil	ing to	
delivery to feed lanes.	Assess reductions assoc	ciated with various mitigation meas	sures.	
PI 1	Affiliation PI 1	Fund Source 1	Amount 1	
Deeane Meyer	UC Davis	CDFA	\$219,000	
71.5	A ((11) 11 - 12) 1			
Pl 2 Peter Robinson	Affiliation PI 2 UC Davis	Fund Source 2 Dairy CARES	Amount 2 \$0	
Peter Robinson	UC Davis	Daily CARES	20	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3	
Jennifer Heguy	UCCE Stanislaus		\$0	
	County			
Report Location				
'				
Related info 1				
See project 93				
Related info 2				

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID 86 Project ID Dairy En		Completed Estimated Completion Date	2012
Project Name			
	a Central California dairy		
Project Description			
2011–12. Ambient and contribution of dairy fe	d flux chamber measurented to NOx emissions. Ad	al dairy in Central California during nents assessed the potential ditional flux chamber measureme ry on the Fresno State campus.	
PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Alam Hasson	CSU Fresno	USDA AFRI	7
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Shawn Ashkan	CSU Fresno	Nat'l Science Foundation	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Steven Trabue	Nat'l Lab for Ag & Environ		\$0
Report Location Atmos. Environ. Vol.	70, 2013, pp 328-336. htt	p://dx.doi.org/10.1016/j.atmosenv	.2013.01.011
Related info 1			
Related info 2			

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

87 R	<mark>Project Typ</mark> Raisin Harv Emissions		Status	Completed	Estimated Completion Date	2013	
Project Name							
Air Curtain Bur	ner Evalua	ation					
Project Descrip							
				st Burn Boss Air Counit with PTO for			
PI 1		Affiliation F	1 1	Fund Source 1		Amou	int 1
Sun-Maid Grov	wers	Sun-Maid (r und oddroc 1			0,000
PI 2		Affiliation F	1 2	Fund Source 2		Amou	int 2
Nisei Farmers							\$0
PI 3		Affiliation P	13	Fund Source 3		Amou	int 3
Kfar Equipmen	nt Co.						\$0
Report Location	on						
Not available							
Related info 1	1						
http://www.va	lleyair.org/			012/12-20- 0Technology%20A	dvancement.pc	lf	
Related info 2							
			and correction	ons to:			

jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Complete	Estimated	2015
88	Reducing			Completion	
	Groundwater Nitrates			Date	

Project Name

Optimizing the Use of Groundwater Nitrogen for Nut Crops

Project Description

Nitrate nitrogen research on advance grower practice using the "pump and fertilize" method in vulnerable groundwater areas for almond and pistachios. The research will evaluate whether the "pump and fertilize" method is effective in reducing use of nitrogen fertilizer based on the nitrates available in the ground water, and subsequently reduces nitrate levels in groundwater aquifers.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
David Smart	UC Davis	CDFA/FREP	\$473,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Patrick Brown	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Jan Hopmans	UC Davis		\$0

Report Location

http://www.reeis.usda.gov/web/crisprojectpages/0215934-advanced-sensing-and-managementto-optimize-water-and-nitrogen-use-in-tree-crops.html

Related info 1

http://www.cdfa.ca.gov/is/ffldrs/frep/index.html

Related info 2

California Air Resources Board **Emission Inventory Branch Summary of Agricultural Emissions Research in California**

P	Project ID	Project Type	Status	In progress	Estimated	September 2016
	89	Soil Nox Emissions			Completion	·
		Modeling			Date	

Project Name

ARB Contract 14-306, Improving DNDC Modeling Capability to Quantify Mitigation Potential of Nitrous Oxide from California Agricultural Soils

Project Description

This project will develop and deliver a modeling tool that will allow for the quantification of the emission reduction potentials from various N2O mitigation strategies that have been identified through previous ARB research. Previous studies have delivered to ARB a validated California-specific modeling tool based on DeNitrification-DeComposition (DNDC), incorporating largely business as usual management practices for baseline emission assessment. However, the model needs further

ia Deng	Affiliation PI 1	Fund Source 1	Amount 1
ia Delig	Univ New Hampshire	ARB	\$112,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Villiam Salas	Applied GeoSolutions	Applied GeoSolutions	\$88,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0
Related info 1			
Related info 1 See Project ID 70			

jspencer@arb.ca.gov 916.324.2717

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

	t Type & Feedlot Mitigation	Status	Completed	Estimated Completion Date	September 201	4
Project Name						
Assessment of Cont	rol Methods for					
PM10 Emissions from		ot Corrals				
Project Description						
Particulate matter teremission rates and a The control measure modified feed time, a	assess the efficacy es tested included:	of various no control,	PM10 emission of	control methods	5.	
PI 1	Affiliation PI 1		Fund Source 1		Amount 1	
Eric Winegar	Winegar Air		CDFA		\$120,000	
Enc winegai	Sciences		ODIA		Ψ120,000	
]
PI 2	Affiliation PI 2		Fund Source 2		Amount 2	
			SJVAPSA		\$19,000	
PI 3	Affiliation PI 3		Fund Source 3		Amount 3	
-					\$0	
Report Location						
https://docs.google.	com/file/d/0B8uym	xkFP0nwe	mRUZTdjejFqb2d	c/edit?usp=driv	e_web&pli=1	
Related info 1						
. voide de mile i						
Related info 2						

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

Study Agency Contract 14-1 CCOS: Development of Methodology to Assess Dairy Silage Management Practices to Reduce Emissions of Volatile Organic Compounds Project Description Evaluate emissions using flux chambers to test a screening method to quantify VOC, GHG and select N compounds from dairy silage and Total Mixed Ration (TMR). PI 1	
Study Agency Contract 14-1 CCOS: Development of Methodology to Assess Dairy Silage Management Practices to Reduce Emissions of Volatile Organic Compounds Project Description Evaluate emissions using flux chambers to test a screening method to quantify VOC, GHG and select N compounds from dairy silage and Total Mixed Ration (TMR). PI 1 C. Schmidt Affiliation PI 1 Independent SJV Study Agency \$89 PI 2 Affiliation PI 2 Fund Source 1 SJV Study Agency \$89 PI 3 Affiliation PI 2 Fund Source 2 CDFA \$9 Affiliation PI 3 Fund Source 3 Amount Amount Fund Source 3 Amount Fund Source 3 Amount	
Silage Management Practices to Reduce Emissions of Volatile Organic Compounds Project Description Evaluate emissions using flux chambers to test a screening method to quantify VOC, GHG and select N compounds from dairy silage and Total Mixed Ration (TMR). Affiliation PI 1 Independent SJV Study Agency \$89 PI 2 Affiliation PI 2 Fund Source 1 SJV Study Agency \$89 PI 3 Affiliation PI 2 Fund Source 2 CDFA \$9 PI 3 Affiliation PI 3 Fund Source 3 Amount Amount Fund Source 3 Amount Fund Source 3 Amount	
Project Description Evaluate emissions using flux chambers to test a screening method to quantify VOC, GHG and select N compounds from dairy silage and Total Mixed Ration (TMR). Affiliation PI 1 Independent SJV Study Agency \$89 PI 2 Affiliation PI 2 Fund Source 1 SJV Study Agency \$89 CDFA \$9 Affiliation PI 3 Fund Source 2 Amoun CDFA \$9 Report Location	
Affiliation PI 2 Affiliation PI 2 Affiliation PI 2 Affiliation PI 3	
Affiliation PI 2 Affiliation PI 2 Affiliation PI 2 Affiliation PI 2 Affiliation PI 3 Affiliation PI 3 Fund Source 1 SJV Study Agency \$89 Amount CDFA Span Affiliation PI 3 Fund Source 2 Amount CDFA \$9 Affiliation PI 3 Affiliation PI 3	
Affiliation PI 1 C. Schmidt Affiliation PI 1 Independent SJV Study Agency S89 PI 2 Affiliation PI 2 Fund Source 2 CDFA S9 PI 3 Affiliation PI 3 Fund Source 2 Amoun CDFA S9 Report Location	
PI 2 Affiliation PI 2 Affiliation PI 3 Affiliation PI 3 Fund Source 2 CDFA Sy Fund Source 3 Amount Sy Fund Source 3 Amount Affiliation PI 3	
C. Schmidt Independent SJV Study Agency \$89 PI 2 Fund Source 2 Amount CDFA \$9 PI 3 Fund Source 3 Amount Affiliation PI 3 Fund Source 3 Amount CDFA Support Location	: 1
Affiliation PI 2 Fund Source 2 CDFA S9 Affiliation PI 3 Fund Source 3 Amount Report Location	
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	3
	\$0
https://drive.google.com/file/d/0B3X7LDg6i_haTlpFbDNBSndSUms/view?usp=sharing	
Related info 1	
Related info 2	

California Air Resources Board **Emission Inventory Branch** Summary of Agricultural Emissions Research in California

			,				
Project ID	Project Ty		Status	In Progress	Estimated		
92	Cattle GH	-			Completion		
	Emissions	s Modeling			Date		
Project Nam	0						
		1 Characteriz	e California	a-specific Cattle Fe	eed Rations and		
				California's Greenh			
nventory					` .		
Project Desc		ula Catania Ca		Madal (OFFM)	de la la la la		
				Model (CEFM), we basis of Californ			
				. However, some			
				d thus do not repr			
by state or re	egion for es	stimating the	enteric CH4	4 emissions. This s	study is intended	l to	
develop a se	t of empirio	cal mathemat	ical models	for estimating ent	eric CH4 emissi	ons	
DI 4		Affiliation P	1.4	Fund Source 1		Λma	unt 1
<mark>PI 1</mark> Ermias Kebr	o o b	UC Davis	1 1	ARB			99,964
illias Kebi	eab	OC Davis		AIND		ψ.	33,304
ય 2		Affiliation P	1.2	Fund Source 2		Λma	unt 2
12		Ailliation	1 2	Fulla Source 2		AIIIU	\$0
							Ψ
기 3		Affiliation P	13	Fund Source 3		Amo	unt 3
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California Air Resources Board **Emission Inventory Branch**

	Sumn	nary of Ag	gricultural	Emissions R	esearch in Ca	lifornia	à
Project ID	Project Typ	ре	Status	In Progress	Estimated		
93	Dairy GHG				Completion		
	Emissions	Modeling			Date		
Project Name							
					roperties of Manu		
California Da	iry Systems	to Improve	Greenhous	e Gas (GHG) E	mission Estimates	6	
Project Desc	ription						
		ted to repres	sent the vari	ous types of ma	anure managemer	nt	
					storage, covered		
					oles of manure wil	l be	
					at each stage of		
					ns about VS in ma ature, and other	anure	
nanagemeni	. Systems m	loueleu acci	rully to lan	ii-size, tempera	ature, and other		
기 1		Affiliation F	11	Fund Source	1	Am	ount 1
Deeane Meyer		UC Davis		ARB		\$151,423	
zoodiio iiioy	J.						,
기 2		Affiliation PI 2		Fund Source 2		Amount 2	
12		Annation	12	i dila codice z		AIII	\$0
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기 3		Affiliation F	11.2	Fund Course ()	Λ	ount 2
-13		Affiliation PI 3		Fund Source 3		Amount 3 \$0	
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Related info	2						
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